
**Metode za preskušanje gostih oblikovanih ognjevzdržnih izdelkov - 13. del:
Specifikacija referenčnih pirometričnih stožcev za laboratorijsko uporabo**

Methods of test for dense shaped refractory products - Part 13: Specification for
pyrometric reference cones for laboratory use

Prüfverfahren für dichte geformte feuerfeste Erzeugnisse - Teil 13: Festlegungen für
Referenz-Brennkegel für den Laboratoriumsgebrauch

Méthodes d'essai pour produits réfractaires façonnés denses - Partie 13: Spécification
pour cônes pyroscopiques de référence pour emploi en laboratoire

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Ta slovenski standard je istoveten z: EN 993-13:1995

ICS:

81.080

Ognjevzdržni materiali

Refractories

SIST EN 993-13:1998**en**

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EUROPEAN STANDARD

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Methods of test for dense shaped refractory products - Part 13: Specification for pyrometric reference cones for laboratory use

Méthodes d'essai pour produits réfractaires façonnés denses - Partie 13: Spécification pour cônes pyroscopiques de référence pour emploi en laboratoire

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CEN

European Committee for Standardization
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Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 187 "Refractory products and materials", the secretariat of which is held by BSI.

It is closely based on the corresponding International Standard, ISO 1146 "Pyrometric reference cones for laboratory use - Specification", published by the International Organization for Standardization (ISO).

EN 993 'Methods of test for dense shaped refractory products' consists of 18 Parts:

- Part 1 : Determination of bulk density and porosity
- Part 2 : Determination of true density
- Part 3 : Test methods for carbon-containing refractories
- Part 4 : Determination of permeability to gases
- Part 5 : Determination of cold crushing strength
- Part 6 : Determination of modulus rupture, ambient temperatures
- Part 7 : Determination of modulus rupture, elevated temperatures
- Part 8 : Determination of refractoriness-under-load
- Part 9 : Determination of creep in compression
- Part 10 : Determination of permanent change in dimensions on heating
- Part 11 : Determination of resistance to thermal shock (ENV)
- Part 12 : Determination of pyrometric cone equivalent
- Part 13 : Specification for pyrometric cones
- Part 14 : Determination of thermal conductivity (hot wire, cross-array)
- Part 15 : Determination of thermal conductivity (hot wire, parallel)
- Part 16 : Determination of resistance to acids
- Part 17 : Determination of bulk density of granular material (mercury method)
- Part 18 : Determination of bulk density of granular material (water method)

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by August 1995, and conflicting national standards shall be withdrawn at the latest by August 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 Scope

This Part of EN 993 specifies the characteristics of a standard series of pyrometric reference cones, which are used for determining the pyrometric cone equivalent (refractoriness) of refractory materials, over the temperature range 1500 to 1800 °C.

The pyrometric reference cones specified are suitable for use in the procedure described in EN 993-12, excluding determination of 1500 and 1800 °C.

2 Normative reference

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 993-12 : Methods of test for dense shaped refractory products - Part 12 :
Determination of pyrometric cone equivalent (refractoriness).

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3 Definitions

For the purposes of this Part of EN 993, the following definitions apply:

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3.1 pyrometric reference cone: A blunt-tipped skew triangular pyramid with sharp edges, of specified shape and dimensions and of such composition that, when mounted and heated under specified conditions, it bends in a known manner with reference to the temperature (see 3.2).

3.2 reference temperature; temperature of collapse: The temperature at which the tip of a pyrometric reference cone reaches the level on which the base of the cone is mounted when the cone is heated at a specified rate under specified conditions.

4 Dimensions and shape of cones

4.1 The nominal dimensions of a cone shall be as shown in figure 1.

4.2 The shape of a cone shall be as indicated in figure 2.

4.3 The cone shall lean in the direction of an edge, as in figure 2. The angle to the vertical to be made by the leading edge or face when the cone is mounted, shall be $8^\circ \pm 1^\circ$.

5 Reference temperatures

Each reference cone shall be of such composition that the temperature of collapse is one of the temperatures shown in table 1, with a tolerance of ± 5 K.

Table 1 : Reference temperatures and cone designations

Cone designation	Temperature ° C	Cone designation	Temperature ° C
ISO 150	1500	ISO 166	1660
ISO 152	1520	ISO 168	1680
ISO 154	1540	ISO 170	1700
ISO 156	1560	ISO 172	1720
ISO 158	1580	ISO 174	1740
ISO 160	1600	ISO 176	1760
ISO 162	1620	ISO 178	1780
ISO 164	1640	ISO 180	1800

NOTE : The relationship between the properties of the ISO cones and other commercially available cones is given in annex A.

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6 Rate of heating

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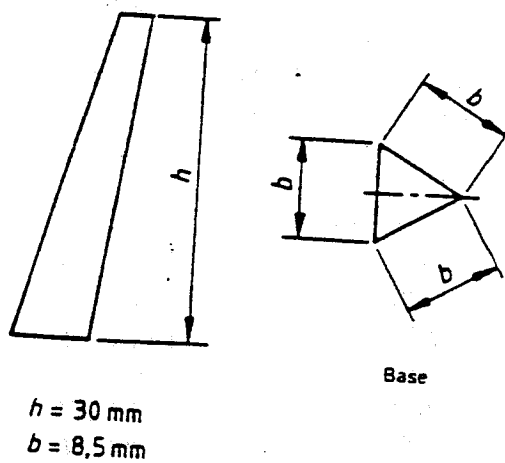
Each pyrometric reference cone conforming to this European Standard shall be suitable for heating to its reference temperature at a rate of 2,5 °C/min.

7 Verification of temperature of collapse

The reference temperature of each batch of cones having the same nominal reference temperature shall be verified for conformity to clause 5 by carrying out the procedure specified in EN 993-12 on a sample of the batch. The temperature of collapse shall be determined by a calibrated thermocouple. The sample, to be taken at random from the batch, shall consist of 2 % of the batch with a minimum of two cones.

8 Marking

Each reference cone conforming to this European Standard shall be marked with the appropriate cone designation as shown in table 1.



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Figure 1 : Nominal dimensions of pyrometric reference cone
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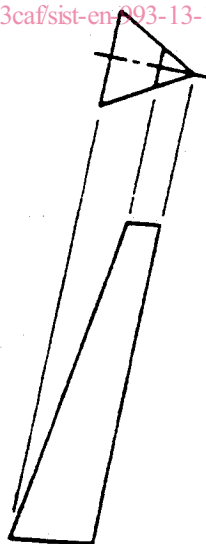


Figure 2 : Shape of pyrometric reference cone